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THE

OPHTHALMIC REVIEW

A MONTHLY RECORD OF OPHTHALMIC SCIENCE

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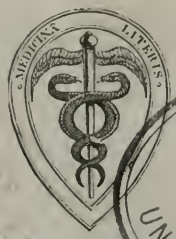

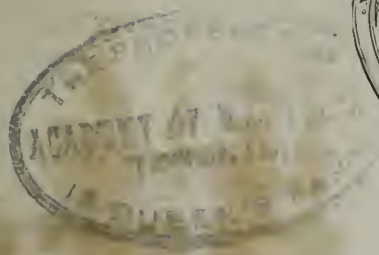

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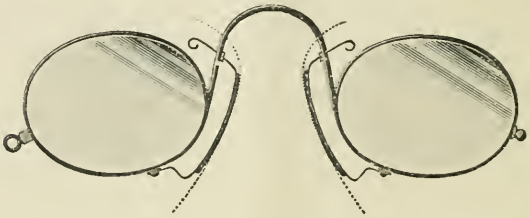

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OBSERVATIONS ON RING-INFILTRATION OF THE CORNEA.

By E. Treacher Collins, F.R.C.S.Eng.

The condition which sometimes follows perforating wounds of the cornea, and which may be termed ring-infiltration or ring abscess of it, is one with which probably all ophthalmic surgeons are familiar, but which has received scarcely any mention in text-books on diseases of the eye.

I was first led to an examination of the cases and specimens of which I give the details in this paper, by the interesting theory of the pathogenesis of this affection, given by Professor Leber in his Bowman Lecture.* I was exceedingly sorry to find that instead of supporting it they offer serious objections to its acceptance. Though I have no new suggestion to make as to the singular distribution of the inflammatory products, I think these cases, and a short description of the affection based on them, is worthy of publication, more especially as so little is to be found on the subject in ophthalmic literature. Briefly, the explanation offered by Leber for ring infiltration of the cornea is as follows:—He considers that when microbes are inoculated into the cornea, their action is not limited to the small area which they occupy, but that a kind of distant action takes place, due to the diffusion of irritating substances.

* *Trans. Ophth. Soc.*, vol. xii.

In this way, what he terms a microbic area is formed around the seat of the wound. White blood corpuscles migrate from the vessels at the corneal margin and make their way towards the microbic area, without, however, quite reaching it, as it offers a resistance to their further advance. Thus a ring of infiltration is formed, the changes in the microbic area itself being simply necrotic in character. It follows that if this theory be true, we ought always to find the wound situated nearly in the centre of the ring of infiltration—as indeed it was in the third of the four cases recorded in this paper; in this

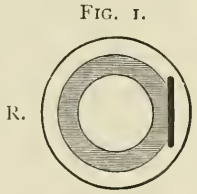

Fig. 1.

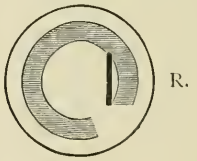

Fig. 2.

Fig. 3.

Fig. 4.

there was a small transverse wound in the centre of the cornea, with a nearly clear area around it, the ring of yellow infiltration being 1 mm. distant from the sclero-corneal margin. In the three other cases, however, the wound was not in the centre of the ring. In Cases 1 and 4 it was outside it, and in Case 3 close to its inner margin. The relation of the wound to the ring of infiltration in these four cases is well shown in the accompanying diagrams.

Ring infiltration of the cornea, so far as these four cases indicate, seems to be an affection which follows perforating septic wounds of either its central or peripheral portions. Whatsoever the locality of the wound, the ring of infiltration occupies precisely the same position, its outer edge being 1 mm. distant from the corneal margin. The ring forms very rapidly after the infliction of the wound; in Case 2, in twenty-four hours it was all but complete. In Case 3, nine days after the injury, there was ulceration commencing in the ring. It is accompanied by pus in the anterior chamber. Microscopically the cell accumulation between the laminæ of the cornea, is seen to be densest at a position almost equi-distant from its anterior and posterior surfaces, or slightly nearer the anterior. There are also sometimes collections of cells between Descemet's membrane and the corneal substance. The area of cornea contained in the ring is at first quite free from any infiltration; later a general diffuse cell increase throughout the whole cornea is observed.

CASE I.—*Wound on inner side of Cornea. Excision eight days later. Complete ring infiltration.*

Charlotte E., aged 50, came under the care of Mr. Nettleship at the Moorfields Hospital on August 25, 1888. Four days previously she had had a wound of the right eye which was excised on August 29. Its condition at that time was described as follows:—The ocular conjunctiva is very œdematous. In the inner third of the cornea is a wound which extends vertically across it, but does not reach quite up to the sclero-corneal margin, either above or below (fig. 1). There is a ring of yellow infiltration in the substance of the cornea which is situated about 1 mm. distant from its margin, and is about 2 mm. wide in its broadest part. There is a large mass of pus in the anterior chamber, and the pupil is irregular.

Pathological Examination.—The yellow infiltration of the cornea is seen to be more in the anterior layers than in the deeper parts of it. A yellow mass fills the lower two-thirds of the anterior chamber. The iris and lens are *in situ*. The retina is thickened, and the optic disc swollen.

Microscopical Appearances.—There is slight diffuse round cell infiltration throughout the whole cornea, but there are two areas in the sections where it is much more intense than elsewhere. These correspond to the two sides of the ring described in the clinical notes. One of these areas of infiltration commences on the inner side of the wound. The layers of fibrous tissue of the cornea immediately beneath the epithelium are not the most involved, but those about the middle of its thickness. There is some accumulation of cells between Descemet's membrane and the fibrous tissue. Between the lips of the wound is a thin layer of cells; the fibrous tissue external to it is but little infiltrated. In the anterior chamber there is a delicate network of fibrinous material supporting numerous round cells with dividing nuclei. Material presenting a similar appearance is seen in the circumlental space and in the anterior portions of the vitreous. There is slight round cell infiltration of the iris and ciliary body.

CASE II.—*Wound a little inside centre of cornea. Excision less than twenty-four hours later. Nearly complete ring of infiltration.*

Robert M., age 67, was admitted to Moorfields Hospital under Mr. Couper, on May 3, 1889. The day previously, at one p.m., his right eye had been injured by a piece of hot iron.

On examination a vertical wound was seen a little to the inner side of the centre of the cornea, 4 mm. in length. (fig. 2). Extending round the cornea, a little distance from its margin, was a nearly complete ring of yellow infiltration; the only part of the ring that was deficient was the lower and inner. There was some lymph in the anterior

chamber, and the iris was discoloured. The globe was excised the same day.

Pathological Examination.—The lens had been perforated. Situated in the vitreous is a piece of metal 7 mm. long and 1 mm. broad. There is yellow lymph about the ciliary processes, otherwise the vitreous is clear. The retina is *in situ*.

Microscopical Appearances.—There are a few round cells between the lips of the wound, and round cell infiltration of the anterior layers of the cornea on each side of it; this only extends a short distance on its inner side, but a considerable way on its outer. The maximum amount of infiltration is not immediately at the wound but a short distance to its outer side and nearly in the middle of the substance of the cornea, *i.e.*, equally distant from its anterior and posterior surfaces. Here there are large groups of round cells in the intervals between the laminæ of the fibrous tissue. On the outer side of the sections of the cornea, at a corresponding distance from its periphery, is another separate patch of cell infiltration, similarly situated and nearly equal in amount. The centre of the cornea is quite free from any excess of round cells. In the anterior chamber, between the iris and lens, in the circumlental space and in the anterior portion of the vitreous, there are numerous round cells with dividing nuclei supported in a network of fibrin. The vessels of the iris and ciliary body are enlarged, and there are groups of round cells around their walls.

Case III.—*Wound in centre of cornea. Complete ring infiltration two days later. Excision nine days after injury, then commencing ulceration.*

Thomas S., aged 48, was admitted to Moorfields Hospital under Mr. Lawford on October 15, 1891. Two days previously he was chopping firewood and a piece flew up and struck his right eye. Examination showed a transverse wound near the centre of the cornea (fig. 3), and a general yellowish haze of the whole of it. Situated 1 mm. internal to its margin was a dense ring of yellow infiltra-

tion. There was a large collection of pus in the anterior chamber. Vision was reduced to p.l. only, and the tension was increased. The following day the cornea was punctured and the hypopyon evacuated. The pus re-accumulated, the tension returned, and the eye became very painful. It was excised on October 24.

Pathological Examination.—The yellow infiltration of the cornea does not extend throughout its whole thickness. Ulceration is commencing in the ring down and in. The lens has been wounded, its substance is suppurating and protruding through the pupil in contact with the cornea. The iris is pushed forwards by the swollen lens and the angle of the anterior chamber narrowed. There is extensive suppuration in the vitreous. The retina is thickened and infiltrated, there are hæmorrhages in it, and the optic disc is swollen.

Microscopical Appearances. — The epithelium is absent from the surface of the cornea over a large area. Some of it lies between the two lips of the wound. In the fibrous tissue at the margins of the wound there is a slight amount of round celled infiltration. Throughout the substance of the cornea there is an excess of cells. There are two zones situated equally distant from the corneal margin, in which this infiltration is more intense than elsewhere. The wound is situated between these two patches, but rather nearer one than the other. The round cells are situated between the laminæ of fibrous tissue of the cornea ; besides the round cells there is some granular substance which stains with logwood. The part which is most infiltrated is not situated immediately beneath the epithelium, but is rather nearer the anterior than the posterior surface of the cornea.

CASE IV.—*Wound on inner side of cornea. Excision about forty hours later. Complete ring infiltration.*

John E., aged 30, was admitted under the care of Mr. Tay to the Moorfields Hospital on March 5, 1893. The previous evening he had received a blow on his left eye,

probably from a stone which was thrown at him. At the time of excision, the day after his admission, the condition of the eye was as follows: There was a large gaping wound extending vertically across the inner half of the cornea; it passed the margin and went into the sclerotic below (fig. 4). A blood-stained suppurating mass protruded through the wound, extending from it in the form of a circle; a little distance from the margin of the cornea was a band of yellow infiltration. The centre of the cornea remained clear.

Pathological Examination.—The lens is absent. The vitreous, blood stained and infiltrated, together with the detached retina, protrudes through the wound.

Microscopical Appearances of the Cornea.—There are round cells and epithelium between the lips of the wound; in the fibrous tissue, on the inner side of it, is some dense round cell infiltration, which, in this position, is nearly evenly distributed throughout the whole thickness of the cornea. The centre of the cornea is entirely free from any infiltration. On the side opposite to the wound, a little distance from the margin, there is a second patch of cell infiltration, which is of greatest intensity about midway between Bowman's and Descemet's membranes. A little external to this patch is a considerable accumulation of cells between Descemet's membrane and the corneal substance.

THE ROD TEST WITH THE ROTARY VARIABLE PRISM.[1]

By Edward Jackson, M.D.

Professor of Diseases of the Eye in the Philadelphia Polyclinic; Surgeon to Wills Eye Hospital.

The rod or cylinder test belongs to that most valuable class in which binocular fusion is prevented by dissimilarity of the images, which allows them to be superimposed without any tendency to fusion.

Mr. Maddox has suggested (page 39 of this volume) the employment of two or more rods placed side by side. On trying such an arrangement it will be found that it gives not a continuous line, but a series of short lines, together constituting a broken line.[2] This necessarily occurs because the light cannot reach the eye through the whole width of the rod. If half cylinders are employed the breaks between the short lines are lessened, but still exist.

With one side of it plane, the light can only be transmitted through a little more than 80° of the circumference of the rod. This, then, is as large a part as can be used to advantage. If such a segment of the rod be used the light will reach the nodal point of the eye from its whole width, provided it be placed at or beyond its focal distance from that nodal point.

To secure a long continuous line of light, therefore, with as thin a segment of the rod as possible, I have used one 10mm. square cut from a rod 20mm. in

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[1] Abstract of a paper read before the Section on Ophthalmology of the American Medical Association, June, 1893.

[2] We cannot satisfy ourselves that this statement is correct. We have carefully tested Maddox's series of rods placed side by side and find that it gives a broad unbroken, though perhaps not absolutely even, line.—Ed.

diameter. A still weaker cylinder might be used, but with it the displacement by the rotary prism of the line of light in the direction of its length would become a matter of importance. One convenient method of measuring the tendency of the visual axes to turn from their proper relation to each other, is by trying what strength of prism acting in the direction of the rod (that is, at right angles to the line of light) is required to bring the apparent position of that line to that of the light as seen with the other eye. For this purpose the variable prism is most convenient and accurate.

Suppose that starting from what we will call the primary position of a prism, we rotate its base in the

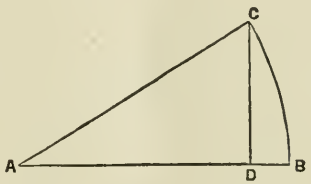

FIG. 1.

AB representing the action of the prism in its primary position; BC the arc over which it has been rotated; AC its action in the new position; AD the component in the direction of the primary position, diminishing with the cosine of the angle; and CD the component perpendicular to the primary direction, increasing with the sine of the angle.

plane, bisecting its refracting angle. In the primary position the full effect of the prism is produced in a certain direction. As this is departed from, its action is exerted in some other direction, but may be regarded as consisting of two conponents, one acting in the primary direction, which diminishes with the cosine of the angle through which the prism is turned, and the other acting at right angles to it, which increases with the sine of the same angle. This is illustrated in the accompanying figure.

The method of utilising this for the variable prism (prism mobile) is to place two equal prisms so that in their primary position they shall neutralise each other, and then to rotate them equally in opposite directions. The components acting in the primary direction neutralise each other in all positions ; and the components perpendicular to the primary direction and increasing with the sine of the angle give the variable prismatic effect sought.

When using the rotary prism in connection with the rod test, one variable component can be made to act in the direction of the line of light (perpendicular to the rod) in which direction its action may be disregarded ; and the other variable, displacing the line of light in the direction of the rod, may be utilised to measure the extent of the insufficiency or heterophoria, so that with the rod test but a single rotary prism need be used.

In turning such a prism from its primary position, the effect which increases with the sine varies at first rapidly, then more slowly. This is a disadvantage, since it gives the least delicacy of change for the smaller degrees of displacement, and makes the change slowest for the highest degrees. On the other hand the effect which diminishes with the cosine of the angle changes very slowly at first and more rapidly later, and on this account is very much better adapted to the purpose of measuring different amounts of deviation. The difficulty with it is that it starts from the maximum and diminishes. This, however, is readily met by fully neutralising this maximum effect in the primary position by a fixed prism. Then as the effect of the rotary prism diminishes with the cosine of the angle, the effect of the fixed prism comes into use progressively increasing until the rotation amounts to 90°, when the effect of the rotary prism will be zero. Passing beyond this, the effect of the rotary prism increases and is added to that of the fixed prism.

For the fixed prism, I have had the rod ground with its flat side inclined to the cylindrical surface, so that it exerts a prismatic action in the direction of its length. The angle chosen for the rotary prism is five centrads (equal to about five degrees refracting angle) with an equal prismatic effect given to the rod. In the primary position they exactly neutralise each other; and by rotation of the prism through 180° every effect up to the maximum of ten centrads is produced. The instrument is represented in the second figure.

With it the lowest degrees of deviation can be measured with minute accuracy. The rotary prism must be turned almost 37° before one centrad of change in prismatic effect is produced.

Fig. 2.

This apparatus has been mounted for use in the trial frame or with a separate handle.

The weakness of the cylinder employed permits the use of the test with a black dot on white paper at the near working distance. Such an application of the cylinder test is probably not generally known. It is most satisfactory with a still weaker cylinder, say, 10 D. cylinder, this being held before the eye (as the prism was held for the Graefe dot and line test). The line is not drawn on the paper, but is seen in the elongated

image of the dot by the eye before which the cylinder is held.

The use of the variable prismatic effect that decreases with the cosine of the angle may be applied with great advantage to the ordinary rotary prism or *prism mobile*. To do this, it is only necessary that the two rotary prisms in their primary positions should be made to act together; and in this position be neutralised by a fixed prism of double their strength. This modification of the prism mobile, by making it an extremely delicate instrument, will add greatly to the satisfaction with which it can be used in cases of slight heterophoria; and cases of slight heterophoria form the mass of those encountered in practice.

FELIX LAGRANGE (Bordeaux). **Studies on Tumours of the Eye, Orbit, and Adjacent Parts.** *Paris, Steinheil.*

This book has for its object the publication of interesting cases seen by the author, and his opinions on their pathology. It is the result of a great amount of careful laboratory work and good clinical observation, and is presented in an attractive form, with good illustrations. He sets out to prove that the envelopes of the eye form a very efficient protection against malignant epi- and peri-bulbar tumours, and that the only weak part in the armour is the sclero-corneal limbus. An invasion of the eye from without almost always takes place by a penetration at this line.

Rare and unknown tumours, such as myoma, carcinoma, and tuberculosis of the ciliary body, have been especially studied, and a more frequent occurrence of leuco-sarcoma of the choroid, which is often described as glioma of the retina, is shown to exist—a mistake which has made the prognosis in this latter affection unduly grave.

The volume also contains accounts of isolated cases which are discussed in the light of previous observations, and the book shows abundant evidence of that sincerity and good faith on account of which the author claims indulgence.

Melanotic Sarcoma of the Bulbar Conjunctiva.—Two cases of melanotic sarcoma of the conjunctiva are described, in which the tumour was seated at the sclero-corneal limbus, extending about equally over the cornea and sclerotic. The mass of each tumour as it grew raised the epithelial layer of the cornea, burst through it, and remained seated on the substance of the cornea, but quite distinct from it, its vessels coming entirely from the conjunctiva. An examination of the published cases of this kind supports the author's view that the growth takes place from the conjunctiva, and thrusts itself as a thin lamina between the epithelium and the substance of the cornea. The author supports this view by the analogy of the tendons, which have a similar structure to that of the sclerotic and cornea, and are never the seat of new growths.

Dealing with the published cases of pure corneal tumours, the author shows that they are very rare, and that there is not among them any case of melanotic tumour. As to the course of development of these tumours, he is struck by their comparative innocence; they are of slow growth, painless, and without tendency to generalise. In spite of this want of malignancy, the growths were really melanotic sarcomata, and not simple tumours which had become stained by hæmorrhage; for this reason their free removal, which involves enucleation of the eye, is necessary.

Epithelioma of the Bulbar Conjunctiva.—In this paper an abstract of all the published cases is given, together with two new cases which the author is able to supply himself.

Epithelioma of the bulbar conjunctiva is always squamous celled, and appears to vary much in malignity, sometimes after long apparent quiescence rapidly degenerating into a malignant form. The sclerotic and

cornea offer considerable resistance to the penetration of an epithelioma, Bowman's and Descemet's membranes preventing invasion of the anterior chamber. If such invasion take place, the seat of penetration is always the sclero-corneal limbus, the cells of the new growth separating the lamellæ of the cornea, entering the canal of Schlemm, and so reaching the anterior chamber. The affection sometimes begins apparently as a phlyctenular conjunctivitis with chronic episcleritis, and is made worse by repeated cauterisation. Sometimes the growth begins as a wart, which may have a blackened appearance owing to hæmorrhage or melanosis.

Treatment in the very earliest stage should be free removal from the globe with cauterisation, or enucleation of the eye.

Tumours of this nature growing from the limbus appear to be much more malignant than those growing from the cornea or sclerotic; the latter have great difficulty in penetrating the dense tissue of the cornea and sclerotic, but the former can be seen histologically to be advancing by means of columns of young active cells towards the canal of Schlemm, the spaces of Fontana, and the anterior chamber. This difference in growth justifies a difference in treatment. If the tumour is growing at some distance from the limbus it may be excised locally, and its seat cauterised, but if it is seated on the limbus the prognosis is much graver, and raises at once the question of excision of the eye, in spite of the retention of good vision and the clearness of the media.

Peribulbar Epithelial Tumours.—The author reports a case of this interesting affection, of which the only account hitherto in existence is by Heyder, published in the *Archiv. f. Augenheilk*, 1887. In this case the relations of the tumour to the eye were very remarkable; all the membranes of the eye, including the cornea, were intact, the only lesions being those resulting from atrophy by pressure. The tumour completely surrounded the eye; in front, over the cornea, there was only a thin layer of it, but further

backwards its thickness was very great. This was purely a peribulbar tumour, whereas Heyder's cases were all epibulbar tumours of greater or less development; for this reason the case in question may be considered almost unique.

The patient was a woman of 73 years of age, who had had the tumour for a very long time; the eye had disappeared in the growth, which was ulcerated on the surface. The contents of the orbit were cleared out without difficulty, but a few days later meningitis set in, and the patient died; at the examination there was found phlebitis of the cavernous sinus, purulent infiltration of the optic nerve sheath, and violent inflammation of the membranes at the base of the brain.

The tumour was about the size of a mandarin orange; the optic nerve had disappeared entirely, without leaving a trace; the muscles of the eye and the capsule of Tenon were destroyed, and none of the contents of the eye could be recognised. On making a section of the tumour the eye was found to be completely buried in it; it was somewhat smaller than normal; the choroid and retina were in their place, the vitreous was intact; the ciliary region lens and all the parts of the eye were normal. Microscopic examination showed that the tumour was made up of epithelial tissue; it could not be called an epithelioma, nor in a restricted sense of the word, a carcinoma.

Its point of origin was the bulbar conjunctiva, whence it had penetrated deeply into the orbit, and completely surrounded the eye.

Intraocular Tumours.

Myoma of the Ciliary Body.—Tumours of the ciliary region are fairly frequent; melanotic and leuco-sarcomata have been often noted, and sometimes the presence of a few muscular fibres has justified their being called myo-sarcomata, but pure leiomyomata of the ciliary body are almost unknown; a single case was reported by Iwanoff at the International Congress of Ophthalmology at Paris

in 1867. This rarity is interesting when the muscular nature of the ciliary body is considered, and it is possible that a more careful examination of tumours of the ciliary body would reveal a greater frequency of myomata.

The case reported here was that of a woman, aged 34, who had had good vision up to seven years before being seen, but whose sight had fallen gradually to less than counting fingers; there had been complete freedom from pain and from obvious outward affection of the eye. When first seen there was found between the iris and lens a small rounded tumour, of the size of a pea, and of a red semi-translucent appearance; there was a second larger tumour apparently connected with the first one behind the lens, of bluish white colour, having the characters of a detached retina. There appeared to be considerable doubt as to whether the tumour, was a cyst or not, and a preliminary incision having shown it to be solid, the globe was enucleated. The tumour, which was growing from the sclerotic at the place of insertion of the ciliary muscle, had destroyed part of the lens, the suspensory ligament and part of the ciliary processes. With the exception of a few connective tissue cells, the tumour was made up of plain muscular fibres and blood vessels; the fibres were arranged in bundles separated by rather wide spaces. The proper fibres of the ciliary muscle were quite distinct from those of the tumour; the new formation lay entirely within and behind the proper muscle, and appeared like an enormously developed radiating muscle. In addition some embryonic cells were found in places, which were thought to be rudimentary muscular fibres. The author pays very little attention to these, and does not admit them to be sarcomatous, but he adds in a footnote that the tumour recurred in the stump five years after; so that it is possible that the growth was a myosarcoma in which there was a great preponderance of muscular fibres.

Primary Carcinoma of the Ciliary Region.—This tumour occurred in a boy of 8 years of age whose sight had gone three years before; the eye was enlarged and staphylo-

matous, and was excised. The retina was completely detached, and two tumours were found to be growing from the ciliary body, separated from each other by a small interval. Histological examination showed the presence of three kinds of structure: (*a*) regular tubes with a central lumen lined with a single layer of cylindrical epithelium; these were characteristic of adenoma: (*b*) tubes filled with epithelial proliferation, duct epithelioma; (*c*) masses of cells made up of badly formed epithelial cells, like those of encephaloid carcinoma. The proper tissue of the region had been almost entirely destroyed by the growth; the vessels were very scanty, the muscular fibres and pigmentary elements had disappeared. These tumours had probably originated from the epithelium of the glands of the ciliary processes, whose existence has been demonstrated by Treacher Collins and Nicati, and although it had in some places the character of an adenoma, yet in its greater part it was undoubtedly carcinomatous. After narrating a case of tubercles of the ciliary body and iris, the author passes on to the consideration of *leuco-sarcomata of the choroid.*

He has collected all the reported cases, and taking these together with Fuchs' results he comes to the following conclusions:—

Ætiology.—They may result from an injury, but more often they are formed spontaneously; they have been discovered after an attack of irido-choroiditis, but they may have been the cause and not the result of the inflammation; they are always primary growths, and are more frequent in children than in adults.

Structure.—The fundamental elements are round or fusiform cells, alone or mixed; the round-celled growths sometimes take an alveolar form—a very grave one; sometimes the round-celled form undergoes suppurative degeneration, or while keeping their essential characteristics the cells may undergo myxomatous degeneration. The fusiform variety may become ossified or cartilaginous.

Seat.—Knapp's statement that these tumours have their origin in the chorio-capillaris has not been definitely proved; non-pigmented tumours can without doubt arise from pigmented regions, but at present the manner of origin of these tumours, and the reason why the surrounding pigment takes no part in their growth, must remain unsettled.

Treatment.—If the growth be strictly confined within the limits of the sclerotic, and have not invaded the optic nerve, simple enucleation of the eye will suffice, but if the growth be not so limited it will be necessary to clear out the orbit.

Endophytic Glioma of the Retina. — The results of the author's observations may be summed up as follows :—

(1) Glioma is sometimes comparatively innocent; it is then endophytic, that is to say, it proliferates inwardly towards the vitreous without necessarily detaching the retina; it then remains for a long time confined to the globe.

(2) It is possible to explain this relative innocence by thickening of the lamina vitrea of the choroid, and of the lamina cribrosa at the nerve entrance—facts which the author has observed.

(3) Glioma of the retina is not as grave as is generally stated; by early intervention a good result may be obtained in one-fourth of the cases.

(4) The two varieties—glioma endo- and exo-phytum—differ much in malignity; the latter, the more malignant form, has been often mistaken for embryonic leuco-sarcoma of the choroid.

In a chapter on the prognosis and treatment of intra-ocular tumours the author shows that the melanotic sarcoma is the most malignant form—out of 115 cases, 75 ended fatally; in 37 of these there was local recurrence in the orbit. The author thinks that this high rate of mortality can be lessened by clearing out the contents of the orbit instead of enucleating merely. The prognosis of leuco-sarcoma depends upon whether the sarcoma is round or spindle celled; of 36 cases nothing was known of 12, there were 11 cures, and 10 fatal results. As to treat-

ment, an examination should be made of the tumour just after enucleation, and the decision as to its nature should determine whether simple enucleation, or the more serious operation of clearing out the orbit, should be performed.

Enucleation is only suitable to fusiform leuco-sarcomata and endophytic gliomata in their early stages; evacuation of the orbit should always be done in melanotic sarcomata, in white round-celled sarcomata, and in gliomata if of long duration. In removing tumours of the optic nerve, the author describes a method which does not involve enucleation of the eye. The tumour was a primary myxo-sarcoma of the nerve; the outer canthus was divided, the external rectus detached after dissecting back the conjunctiva, the tumour was freed from its surrounding structures; the optic nerve was next divided far back towards the apex of the orbit; the back of the eye with the nerve attached to it was turned forwards and brought out through the wound; the tumour was then removed, and the eye replaced in position. By this means there was less risk of destroying the eye, as its upper, inner, and lower attachments were not interfered with. The cornea became hazy, and the tension was reduced, but there was still an eye in the orbit, and not an empty socket, without the possibility of wearing an artificial eye.

Lagrange next describes a case of cystic fibro-sarcoma of the orbit, the interest of which lies in the cyst surrounding the tumour, which was made up of connective tissue, without endothelium, and which he likens to a hygroma.

A case of melanotic sarcoma of the lid follows. The book ends with the author's views on the pathology of chalazion, and a note on a case of palpebral horn.

W. T. Holmes Spicer.

E. LANDOLT (Paris). On the Fields of Fixation, Monocular and Binocular, Secondary Deviation, and False Projection, in Paralysis of the Ocular Muscles. *Archives d'Ophtalmologie, May*, 1893, *p.* 257.

In a short but interesting paper Landolt discusses certain points connected with paralytic disturbances of binocular vision, and illustrates them by means of diagrams taken from a typical case of partial paralysis of the left external rectus. We have attempted to represent his diagrams here in a simplified form, which, as it can be reproduced by the printer without the aid of a block, may perhaps be found convenient for similar graphic records of other cases.

The observations relate primarily to the extent of movement in the horizontal plane possible to each eye, and secondarily to the extent of harmonious, as compared with that of inharmonious, movement of the two eyes. As is well known, Landolt uses the term fixation-field to express the extent of the area over which the eye can fix.

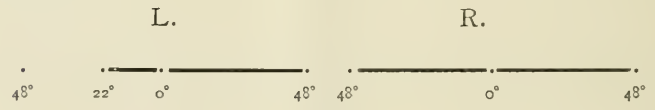

FIG. 1.

Fig. 1 shows the limits of the fixation field for each eye separately. The right eye, in the case in question, could make a normal excursion, viz., 48°, both inwards and outwards. The left eye could make a normal excursion inwards, but one of only 22° outwards; it had therefore lost about 26° of movement outwards, and its total horizontal movement amounted to 70°, as compared with 96° in the fellow eye. The left eye had moreover a convergent strabismus of 8°—presumably when the right eye was in its median position.

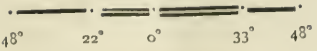

Fig. 2.

Fig. 2 shows the extent to which binocular vision was disturbed. Either eye could, as we have seen, fix any point between 48° on the right, and 22° on the left. Between this latter point and 48° on the left, the right eye only could fix. But although both eyes could command so large a portion of the normal fixation field they could not command it harmoniously, that is to say, they could fuse the images and obtain true binocular vision only over a very much smaller portion, viz., from 48° on the right to 33° on the right—a distance of 15°; throughout the rest of the normal fixation field there was, of course, diplopia.

The reason of this inco-ordination is well known. Fixation of an object moving towards the side paralysed demands a greater effort on the part of the paralysed muscle than on that of the sound, or, to put the matter more physiologically as we think, the effort issuing with equal energy to the two sides acts more effectively through the sound than through the damaged nerve, and produces unequal contractions in the two muscles. If the patient elect to fix with his sound eye he will send too small an impulse to his paralysed eye; and if he elect to fix with his paralysed eye he will send too great an impulse to his sound eye. The only matter for surprise is that he should, in spite of this difficulty, be able to fuse the images over a certain part of the fixation field, as seen in fig. 2.

Passing in the next place to the question of false projection, Landolt measured the angular distance between the actual and the apparent positions of the object as seen by the paralysed eye. The sound eye being covered, the patient was placed before a graduated scale upon the wall, and was made to rapidly indicate with his finger the apparent position on the scale of a given point. To avoid corrective movements through sight of the arm, a piece of cardboard was placed between the neck and the wall so as to hide the arm entirely; the finger became visible only

when it was raised to the scale. The error of projection, or orientation, was 4° or slightly more.

Finally, Landolt measured the angular values of the primary and the secondary deviations respectively. When the sound eye fixed, the paralysed eye deviated 8°, as already stated. When the paralysed eye fixed, the sound eye deviated 12°. In other words, the secondary deviation exceeded the primary by 4°—the exact amount of the error of orientation when the paralysed eye was used alone.

This correspondence is not a matter of fortuitous coincidence; it is in fact a matter of necessity. The excess of energy which is needed by the left eye reveals itself in this eye by a false orientation, and in the other by an excess of movement. The author tells us that many other cases examined in like manner gave like results.

P. S.

AMERICAN MEDICAL ASSOCIATION—SECTION OF OPHTHALMOLOGY.

Meeting at Milwaukee, June, 1893.

Dr. Samuel D. Risley, Philadelphia, in the Chair.

Treatment of Pannus by Digestive Ferments.—Dr. J. A. Lydston (Chicago) pointed out that the destruction of Bowman's membrane and the direct invasion of the deeper layers of the cornea by true granulation masses was the condition present in more serious forms of pannus. For the removal of such new-formed tissue he had employed a preparation of the digestive ferment of *caricaya papaya* in powdered form, mixed with boric acid and dusted upon the affected surfaces. This acted in either acid, neutral, or alkaline media, though best in the latter. Its employment in a series of cases had been followed by marked improve-

ment. The results of previous experience with pepsin preparations has been unsatisfactory, but he had some hope that pancreatin might prove more efficient.

Treatment of Granular Lids.—Dr. C. B. Blubaugh (Parkersburg) had found the strong astringent applications not only not beneficial, but positively harmful. He had treated a series of over 200 cases without having recourse to them. In those cases where well-marked granulations were present, he used scraping of the affected surface with curettes adapted to fit the different portions of the lids, obtaining in the cases best suited for the treatment prompt recovery.

Electro-Magnet Extraction of Foreign Bodies.—Dr. W. H. Wilder (Chicago) reported eight cases, in two of which the results were good, in one moderate, in one the eyeball was preserved without sight, and four were failures. He had collected the reports of 258 cases, the results of which in 58 were good, in 40 moderate, in 37 the eye-ball was preserved, and in the remainder 123 were failures. It was probable, however, that among published cases the proportion of those that were successful was unduly large, and that the more valuable statistics were those of single operators of considerable experience, who reported all their cases in which magnet extraction was attempted.

Quiescent Foreign Bodies within the Eye-ball.—Dr. W. B. Johnson (Paterson, N.J.) reported a series of cases in which foreign bodies had been retained in different portions of the eye-ball, sometimes for several years, the eye remaining quiescent and even retaining full vision. He believed that in many cases opportunity should be given for the eye to become quiescent, rather than that any immediate radical attempt at removal should be made. The danger was from later involvement of the other eye if the patient removed out of reach of help. Under such circumstances he would not advocate leaving a foreign body in the vitreous.

Sympathetic Neuritis after Evisceration.—Dr. F. C. Hotz (Chicago) reported the case of a man aged 21, whose right eye had been injured years before by the blade of a penknife. The globe had gradually grown considerably smaller than the left. In the summer of 1888 it had become very sensitive, with hyperæmia and lacrymation, but had got better again as the cold weather returned. In the three succeeding summers the same thing occurred. He came last summer with the eye-ball red and sensitive; there was photophobia and interference with the use of the left eye. Evisceration was performed; the posterior portion of the choroid was found calcareous, but the contents of the sclera were removed completely without great difficulty, and the conjunctiva brought together with a suture. Next day there was great chemosis, swelling of the lids, and severe headache. This condition gradually improved, but on the seventeenth day the left eye became red; firm pressure on the globe was painful; vision was impaired and variable. The optic papilla was swollen, red, and hazy. The redness and haziness of the disc, and failure of vision increased for some days, then gradually passed away until recovery was complete. He regarded the optic neuritis as clearly an effect of the evisceration and the inflammation in the right orbit subsequent to it. He had practised evisceration, because of the claim that it left a better stump for the adjustment of an artificial eye. He had made some careful measurements of the movements of artificial eyes fitted after evisceration or enucleation, and when placed over an atrophic eye-ball they had shown in each case a movement outward of 15 to 25°, inward of 15 to 20°; but no difference in favour of either evisceration or the retention of an atrophic eye-ball. He, therefore believed that while evisceration caused more subsequent pain, slower healing, and perhaps danger of such *sequelæ* as that reported in the present case, it offered no advantages over the enucleation of the eye-ball.

Dr. H. Gifford (Omaha) argued that we can never be sure of asepsis in the case of any wound in the conjunctival sac, and had, therefore, given up the closure of the conjunctiva

with a stitch after evisceration, but packed the cavity with iodoform gauze instead. This greatly diminished the subsequent pain, although the healing after the operation was still slow. The temporary character of the neuritis in this case seemed to indicate that it was due to the diffusion of toxines, rather than to any actual transference of germs to the sympathising eye.

Fatal Meningitis following Enucleation.—Dr. S. D. Risley (Philadelphia) reported a case occurring in a man aged 47, but who looked much older. He came for chronic inflammation of the eye. The eye was enucleated, and on microscopic examination all its tissues were found to be the seat of suppurative inflammation, which extended back into the optic nerve, so far as this was removed—about half an inch behind the eye-ball. Recovery was slow, but apparently complete at the end of fourteen days, when he was discharged. About the twenty-first day there was some suppuration from the stump; this continued, and was followed by symptoms of cerebral involvement. There was no rise in temperature, but he died with prolonged coma and opisthotonos.

Experimental Intraocular Injections of Antiseptic Solutions.—Dr. Geo. E. de Schweinitz (Philadelphia) reviewed the literature of this subject, and reported the results of a series of experiments undertaken to determine whether the injection of antiseptic fluids directly into the normal vitreous of rabbits would produce permanent lesions or not, and to test the therapeutic value of these injections in suppurative ophthalmitis.

In six experiments with mercuric chloride solution, 1-500 to 1-5000 in strength, from two to five minims of the solution in each instance caused a permanent lesion of the vitreous or retina, or usually of both. In eight experiments with aqua chlorinata (officinal strength) five to ten minims produced permanent lesions of the vitreous in all but one. Five experiments were made with cyanuret of mercury, 1-1000, causing positive lesions in each

instance. One experiment with trichloride of iodine, 1-1000, caused a very dense permanent lesion. One with pyoktanin, 1-1000, caused a faint opacity of the vitreous.

In four rabbits, in which purulent hyalitis had been produced by injection of staphylococcus emulsion, subsequent treatment with intraocular injections of stronger solutions of mercuric chloride, or aqua chlorinata, failed to produce signs of amelioration. In one experiment with a dog, favourable results were obtained by this treatment. The simultaneous injections of the antiseptic with the staphylococcus emulsion failed to check the development of a purulent inflammation.

Microscopic examination of a number of the eyes showed detachment of the retina, œdema, and sometimes detachment of the choroid, incarceration of the choroid in the wound of entrance, a form of retinitis analagous to retinitis proliferans, and the formation of young connective tissue in the vitreous.

The results of these investigations were in direct opposition to the therapeutic value of such injections, but it was pointed out that with a single exception rabbits were employed, and that similar experiments should be made on the eyes of dogs, especially as in the one case where this was tried the intraocular injection was followed by the amelioration and probable cure of a violent suppurative ophthalmitis.

Dendritic Keratitis. — Dr. W. H. Wilder (Chicago) reviewed the apparently independent descriptions of related cases by Horner, Kipp, Emmert and Hansen Grut, and reported three cases of his own. He was inclined to the opinion that these cases were all essentially of one class, and that they should be grouped under Horner's heading of herpes of the cornea. Undoubtedly many of them occurred in persons suffering from malarial poisoning, and were greatly benefited by anti-malarial treatment. Others ensued upon other febrile affections, and probably all depended on some general impairment of nutrition.

Some were extremely obstinate, and it is doubtful if they were at all benefited by treatment, though they ended in recovery. Cases occurring in malarial patients were greatly benefited by anti-malarial treatment, but this did not prove that malarial poisoning was the specific cause.

Optic Neuritis with Brain Tumour.—Dr. E. P. Morrow, (Canton, O.), reported two cases, with autopsies, in which double optic neuritis had been the only positive sign of organic brain disease. In one case, a lad aged 17, a glioma two inches long by one inch in diameter was found at the base of the right temporal lobe. In the other case, a male, aged 19, a soft glioma was found on the upper surface of the cerebellum.

Optic Nerve Disease accompanying or following Fevers, especially Typhoid.—Dr. J. A. White (Richmond, Va.) had met with many cases of optic atrophy following so closely on typhoid and other fevers that there was every probability they were results of these diseases. That the literature on the subject is very meagre proves nothing, except that no one has investigated it. Inquiry as to the subject had elicited replies from twenty-one prominent American ophthalmic surgeons. Six reported little or no experience with such troubles; others had seen cases of atrophy following what was regarded as typhoid fever; and a few had seen cases of optic neuritis. The consensus of experience seemed to show that such affections are more common than has been supposed.

Dr. White reported three cases: one of optic neuritis after typhoid fever in a patient whose eyes had previously been under observation, where there was subsequently complete recovery. The eye affection began during convalescence from the fever at the end of three weeks, and continued more than three months before recovery was complete; there was swelling of the papilla, amounting to 1 D.; and the same diagnosis was given independently by another experienced surgeon. There was some astigmatism present, and recovery had occurred after its correc-

tion. A brother of this patient had been seen some years previously by another ophthalmic surgeon, also suffering from neuritis following typhoid fever.

The second case was one of atrophy. The sight had become defective during an attack of typhoid fever four months before, and had continued to grow worse in spite of improved general health. Both nerves showed decided atrophy. Vision was: R. 5-200ths, L. 1-400ths. He was given increasing doses of strychnia, and manifested no toxic symptoms until one-fifth of a grain was taken three times a day. After seven months of treatment vision was: R. 20-200ths, L. 17-200ths.

The third case was one of complete blindness with pale blurred discs, following remittent fever, supposed to be of malarial origin. The patient, a girl, had taken two and a-half grains of quinine daily for three or four days. She had some headache, but no other signs of meningitis. Under increased doses of potassium iodide, followed by strychnia and dilute phosphoric acid, improvement commenced and went on to perfect recovery within four months.

Posterior Sclerotomy preliminary to Glaucoma Operations.—Dr. H. Gifford (Omaha) had found that an incision through the sclera an eighth of an inch in length, near and parallel to the outer border of the inferior rectus muscle, greatly lessened the difficulty of such operations as iridectomy and the anterior sclerotomy in eyes in which the tension was high and the anterior chamber very shallow. It also avoided the danger of dislocation of the lens, or failure of the anterior chamber to refill. He was, however, uncertain as to its value in preventing subsequent hæmorrhage. This practice he had adopted independently, but found it had been previously urged by Mr. Priestly Smith.

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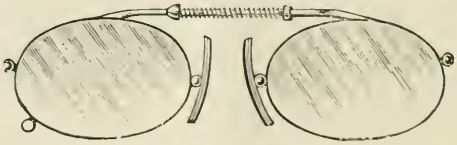

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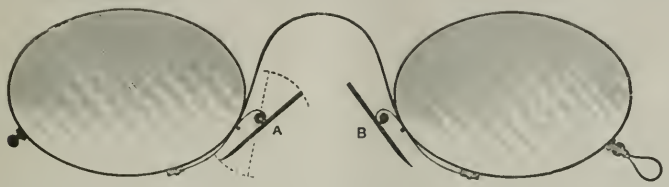

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